

INTRODUCTION

The Relativistic Heavy Ion Collider facility at the Brookhaven National Laboratory enables studies of nuclear phenomena in collisions of light and heavy ions, and polarized protons. The collider was constructed in an existing 3.834 km long ring tunnel, and is in operation since 2000. The major performance design requirements for the collider was a beam energy ranging up to 100 GeV/n for the heaviest ions, e.g. for Au-Au, and an average luminosity at top energy of $2 \times 10^{26} \text{ cm}^{-2} \text{ s}^{-1}$ at each of the possible six crossing points. This luminosity goal has been exceeded, and the new performance goals are called the Enhanced Design parameters. These call for a four-fold increase in the average heavy ion luminosity. In addition, a polarized proton program was developed. The Enhanced Performance parameters for polarized protons are a maximum energy of 250 GeV, an average store luminosity of $150 \times 10^{30} \text{ cm}^{-2} \text{ s}^{-1}$, an average store polarization of 70%, and the availability of longitudinally polarized beams at 2 interaction points.

This Configuration Manual shows the current and future expected collider performance and, at the same time, the accelerator physics and engineering parameters of the machine. It also gives the locations of all major ring components, notably the location of magnets, rf cavities, beam position monitors, and injection and beam dump equipment. The Configuration Manual, together with drawings and specifications, establishes the configuration of the RHIC facility.

In order to prevent confusion caused by outdated information, each page of the Configuration Manual will be coded as to its Accelerator System, the page number within an Accelerator System, and the revision date. The Table of Contents indicates the valid revision of the Configuration Manual.